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COMPARATIVE STUDY OF MALARIA IMPACT IN CHHATTISGARH AND INDIA

Mr. Prashant Dubey[1], *Mr. Amritesh Shukla[2]

[1] Assistant Professor, Govt. V.Y.T. PG Autonomous College, Durg, Chhattisgarh
[2] Assistant Professor, IGG PG College, Vaishali Nagar, Bhilai, Chhattisgarh (Corresponding Author)

ABSTRACT

Malaria continues to be a critical public health issue in India, despite national efforts to control and eliminate the disease. Chhattisgarh, a state in central India, contributes disproportionately to malaria-related deaths, reflecting regional disparities in healthcare, socioeconomic development, and geographical challenges. By comparing malaria cases and deaths in Chhattisgarh and India from 2020 to 2024 (up to August), this paper identifies significant gaps in malaria control in Chhattisgarh. The study includes a detailed analysis of the causes, effects, and prevention measures, along with data visualization through graphs. Finally, recommendations are provided to reduce the malaria burden and align Chhattisgarh with India's malaria elimination goals.

KEYWORDS: Malaria, Chhattisgarh, India, Vector-Borne Diseases, Geographical Disparities, Public Health

INTRODUCTION

Overview of Malaria in India

Malaria is a life-threatening disease caused by Plasmodium parasites, transmitted through the bites of infected female Anopheles mosquitoes. Despite global efforts to reduce malaria mortality, India remains one of the highest-burden countries. However, progress has been made in recent years, with a significant decline in cases and deaths, attributed to national malaria control programs and community-based interventions.

Focus on Chhattisgarh

Chhattisgarh, characterized by dense forests, tribal populations, and limited healthcare infrastructure, remains a malaria hotspot. The state's geographical and socioeconomic challenges exacerbate its malaria burden, contributing approximately 20% of the national malaria deaths annually.

METHODOLOGY

Data Sources

1. National Vector Borne Disease Control Program (NVBDCP): Annual reports from 2020–2024.
2. Chhattisgarh State Health Department: Data on malaria incidence and deaths.
3. WHO Malaria Reports: Global and regional malaria data for comparison.

Tools and Techniques

Data was analyzed using Python for trend analysis and visualizations. Line graphs and bar charts were created to show comparative trends in malaria cases and deaths across Chhattisgarh and India.

Results

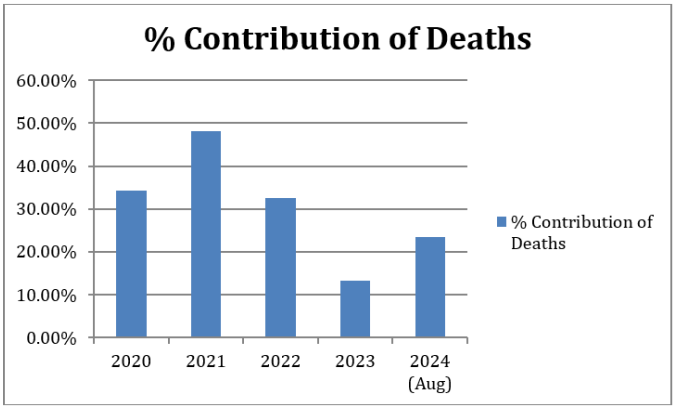
1. Malaria Cases and Deaths in India (2020–2024)

India has witnessed a consistent decline in malaria cases and deaths, as shown in the graph below.

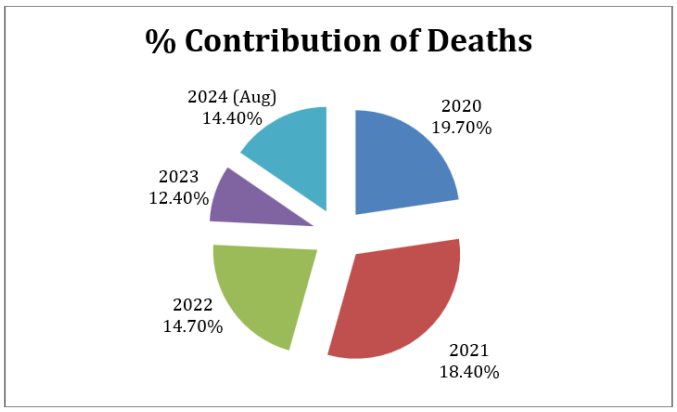
Year	India – Cases	Chhattisgarh - Cases	% Contribution of Chhattisgarh	India - Deaths	Chhattisgarh - Deaths	% Contribution of Deaths
2020	186,532	36,667	19.7%	93	32	34.4%
2021	161,753	29,733	18.4%	56	27	48.2%
2022	176,522	25,920	14.7%	83	27	32.5%
2023	227,564	28,167	12.4%	83	11	13.3%
2024 (Aug)	151,519	21,764	14.4%	34	8	23.5%

Source : NCVBDC(2023-24)

Table 1: Here is the comparison between India and Chhattisgarh in a tabular format based on the malaria situation from 2020 to 2024 (up to August):



Graph 1: Chhattisgarh Percentage Share in Total Malaria Deaths in India



Graph 2: Chhattisgarh Percentage Share in Total Malaria Cases in India

The comparison of malaria cases and deaths between India and Chhattisgarh from 2020 to 2024 highlights significant regional disparities and progress in malaria control efforts. Chhattisgarh, despite having a smaller population, contributed disproportionately to India's malaria burden, with its share of cases decreasing from 19.7% in 2020 to 14.4% by 2024. Similarly, its share of malaria deaths, which peaked at 48.2% in 2021, dropped to 23.5% by August 2024. While both India and Chhattisgarh saw reductions in cases and fatalities, Chhattisgarh's slower progress reflects ongoing challenges like inadequate healthcare infrastructure, socioeconomic constraints, and environmental factors. The declining trends, however, indicate improvements due to targeted interventions such as vector control programs, community education, and expanded healthcare access. Despite these advancements, Chhattisgarh's persistent contribution to national malaria deaths underscores the need for sustained, region-specific efforts to achieve parity with national progress and align with India's malaria elimination targets by 2030.

Causes of Malaria in Chhattisgarh

1. ***Geographical Factors***
   Dense forests and stagnant water bodies serve as breeding grounds for mosquitoes. High humidity and prolonged monsoons sustain mosquito populations.

2. ***Socioeconomic Factors***
   Poverty and illiteracy limit access to preventive measures like insecticide-treated bed nets. Lack of awareness about symptoms and early treatment.

3. ***Healthcare Infrastructure***
   Remote villages and tribal areas lack proper healthcare facilities and trained personnel. Delayed diagnosis and treatment increase mortality.

Effects of Malaria

1. ***Health Impact***
   High mortality, especially among children under five and pregnant women. Chronic health issues like anemia and developmental delays.

2. ***Economic Impact***
   Loss of productivity due to illness and death. Increased healthcare expenditure on treatment and prevention.

3. ***Social Impact***
   Stigma and discrimination against affected individuals in some tribal communities.

Prevention Measures

1. ***Vector Control***
   Use of Long-Lasting Insecticidal Nets (LLINs): Protects individuals during sleep. Indoor Residual Spraying (IRS): Effective in reducing mosquito populations.

2. ***Early Diagnosis and Treatment***
   Availability of rapid diagnostic kits and anti-malarial drugs in remote areas. Strengthening primary healthcare facilities.

3. ***Community Awareness***
   Conducting awareness campaigns about malaria prevention and treatment. Training community health workers in tribal regions.

4. ***Environmental Management***
   Elimination of stagnant water bodies near residential areas. Use of larvicidal agents to control mosquito breeding.

Recommendations

1. ***Strengthening Healthcare Access***
   Build healthcare centers in remote and tribal areas. Train local health workers to diagnose and treat malaria effectively.

2. ***Expanding Vector Control***
   Distribute LLINs in high-risk areas. Increase coverage of IRS in remote villages.

3. ***Enhancing Surveillance***
   Establish robust monitoring systems for real-time data collection and analysis. Focus on high-risk districts to prioritize interventions.

4. ***Community Participation***
   Involve local leaders and NGOs in malaria control programs. Promote behavioral changes through education and incentives.

The Chhattisgarh government has been pioneering in implementing targeted interventions to combat malaria, especially in high-burden tribal and remote areas. Here is a detailed breakdown of their efforts:

1. **Malaria Mukt Bastar Abhiyan (Malaria-Free Bastar Campaign);**
   Objective:
   Launched in January 2020, this flagship program aims to eradicate malaria from the Bastar region, which has historically been a malaria hotspot due to its dense forests, poor healthcare infrastructure, and difficult terrain.

Method:
A door-to-door screening campaign was launched using Rapid Diagnostic Kits (RDKs). On-site treatment was provided to those who tested positive.

Impact:
In the first phase, about 1.4 million people were tested, identifying 64,646 malaria cases, all of which were treated. The second phase, in July 2020, covered 2.3 million people. These efforts have significantly reduced the prevalence of malaria in Bastar, bringing down the positivity rate.

2. **Distribution of Insecticide Treated Nets (ITNs);**
Health workers distribute ITNs to families in high-risk areas, especially pregnant women and children under five. These nets are very effective in preventing mosquito bites, especially during sleeping hours. Regular campaigns ensure that families are educated on the correct use and maintenance of these nets.

3. **Indoor Residual Spraying (IRS);**
Walls inside houses are sprayed with long-lasting insecticides that kill mosquitoes on contact. This intervention is carried out periodically in endemic areas and is effective in controlling mosquito populations.

4. **Community Awareness Campaigns:**
Public awareness drives an essential part of malaria control.

Methods:
Village games, rallies, and folk games to educate communities about malaria prevention.

Posters, pamphlets, and advertisements in local languages on cleanliness and the importance of creating mosquito-free sites. Communities are encouraged to participate in activities such as cleaning stagnant water sources and maintaining hygiene.

5. **Integration with Mukhyamantri Haat Bazaar Clinic Yojana:**
Mobile health teams visit weekly markets (haat bazaars) in remote areas to provide free malaria testing and treatment. This initiative ensures that even inaccessible communities have access to essential health services.

6. **Enhanced Surveillance and Monitoring:**
The government has strengthened surveillance systems to track malaria cases more effectively. Data from field surveys and screenings is digitized to identify trends and target high-risk areas.

7. **Capacity Building and Training.**
Training programmes for health workers, ASHAs (Accredited Social Health Activists), and other community health volunteers to ensure proper malaria detection and treatment protocols. ASHAs play a vital role in conducting door-to-door screening and follow-up care for patients.

8. **Partnerships and Collaborations:**
The state collaborates with national and international organizations, such as the World Health Organization (WHO), for technical and financial support. Research partnerships help in identifying effective strategies for malaria control.

Results and Impact:
Over the years, these interventions have yielded significant results: By 2023, the malaria incidence in the state had dropped to 0.51%. Chhattisgarh has reported one of the highest reductions in malaria cases in India. The Malaria Mukt Bastar Abhiyan has become a model for malaria control in other parts of the country.

Challenges:
Dense forests, limited road access, and socio-economic challenges in tribal areas make it difficult to sustain malaria elimination efforts. Driving behavioural changes, such as consistent use of ITNs, remains a challenge in some communities.

Future plans:
The government is looking to expand similar campaigns to other malaria-prone areas in the state. Scaling up health infrastructure and continued community involvement are critical to sustaining the progress made so far. The government's comprehensive and community-centered approach has put Chhattisgarh on the path to malaria elimination, setting an example for other states in India.

CONCLUSION
This comparative study emphasizes the geographical, environmental, and socioeconomic factors that make Chhattisgarh a malaria hotspot. While India has made significant strides in reducing malaria deaths, Chhattisgarh's slower progress underscores the need for region-specific interventions. By improving healthcare access, expanding vector control, and increasing community awareness, Chhattisgarh can align with India's goal of malaria elimination by 2030.

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